

WO 2005/010147 A2

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
3 February 2005 (03.02.2005)

PCT

(10) International Publication Number  
**WO 2005/010147 A2**

(51) International Patent Classification<sup>7</sup>:

C12N

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:

PCT/US2004/018370

(22) International Filing Date: 9 June 2004 (09.06.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/478,277

13 June 2003 (13.06.2003) US

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (for all designated States except US): THE GENERAL HOSPITAL CORPORATION [US/US]; 55 Fruit Street, Boston, MA 02114 (US).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(72) Inventors; and

(75) Inventors/Applicants (for US only): IRIMIA, Daniel [RO/US]; 65 Chelsea #309, Charleston, MA 02129 (US). TONER, Mehmet [TR/US]; 100 Pilgrim Road, Wellesley, MA 02481 (US).

(74) Agent: CLARK, Paul, T.; Clark & Elbing LLP, 101 Federal Street, Boston, MA 02110 (US).

(54) Title: DEVICE AND METHOD FOR CONTACTING POCOLITER VOLUMES OF FLUIDS

(57) Abstract: The invention features devices for mixing fluids, e.g., for lysing cells, and methods of use thereof. One device is based on the ability to control the flow of fluids, e.g., by contact angle and channel size. Fluids in this device can be divided to form segments of controlled volume, which are then brought together to initiate mixing. An exemplary use of the device is for the lysis of single cells. Another device is based on the ability to mix two fluids in a channel and affinity capture of analytes. The devices can be integrated on the same chip with other devices, for example, for cell handling or analysis of DNA, mRNA, and proteins released from the lysis of a cell.